

# Work Order ID 69959

Wednesday, May 25, 2011 7:50:49 AM



Page 1

Item ID: D407-667-205

Accept



Setup Start



Revision ID:

Stop



Item Name: Crösstube Aft

Start Date: 5/25/2011 Start Qty: 1.00



Cust Item ID:

Required Date: 6/14/2011 Req'd Qty: 1.00



Customer:

Reference:

Approvals:

Process Plan:

Date: 11-05-25

Tooling:

Date:

QC:

Date:

SPC (Y/N):

Date:

Run Start



Stop



Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
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Draw Nbr.	Revision Nbr
D407-667-245	Rev F

100 0.00



DOCUMENT CONTROL

DC

Memo

0.00

Document Control

Photocopy bluefile and create labels as per PPP D407-667-205 CHG006

CHG007 Subtotal

110 0.00



Pick Kit

Packaging

Packaging

Memo

0.00

Packaging

DP

11-7-26

120 0.00



BENDING MACHINE - CROSSTUBES

CNC Bend 1

Memo

0.00

CNC Delta 100 Bender

1-Bend tube as per Dwg D407-667-245 using CNC bender program 407 Aft and Folio 21

DP

11-7-26

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

**Work Order ID 69959**

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Item ID: D407-667-205

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Item Name: Crosstube Aft

Start Date: 5/25/2011 Start Qty: 1.00

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Required Date: 6/14/2011 Req'd Qty: 1.00

Customer:

Reference:

Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_

Run Start

QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Stop

Sequence ID/  
Work Center IDOperation  
DescriptionSet Up/  
Run Hours

Tool ID

Tool #

Plan  
CodeAccept  
QtyReject  
QtyReject  
NumberInsp.  
Stamp

130

QC15- Crosstube Dimensional Check

0.00



QC

Memo

0.00

Quality Control

① AB 11-07-27  
PTO

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: D407-667-205 PAR #: N/A Fault Category: PROCESSING NCR: Yes No DQA: 8 Date: 10-08-2011  
 Resolution: UAI Disposition: UAI QA: N/C Closed: OK Date: 11-08-11

NCR: 69959		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			
11-07-27	130	Inspection Sheet has incorrect dimensions	<u>AS</u>	Correct and update Inspection Sheet	<u>11.08.10</u>	<u>10-11-08-2011</u>	<u>AS</u>	<u>11-07-27</u>
		PAPERWORK (WORK ORDER) <del>THEORETICAL</del> INCLUDED REV B OF INSTRUCTION SHEET, SHOULD HAVE INCLUDED REV C (DATED 11-02-11)						

NOTE: Date & initial all entries

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Item ID: D407-667-205

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Start Date: 5/25/2011 Start Qty: 1.00

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Customer:

Reference:

Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_  
QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Run Start  
Stop

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
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140

0.00



Crosstubes

Crosstubes

Memo

0.00

Crosstubes

1-Drill pilot holes in tube using drill Jig DT8583 &amp; DT8584 as per Dwg D407-667-245. Drill all (3) top holes.

2-Drill and Ream all holes in tube to finish size using drill Jig DT8583 &amp; DT8584 as per Dwg D407-667-245. Check dimensions between holes on all four sides.

3-Flip tube and switch drilling Jigs from right to left, left to right. Locate Jigs off existing holes using "T" pins.

4-Drill pilot holes using drill Jig DT8583 &amp; DT8584 as per Dwg D407-667-245. Drill only the top (2) holes.

5-Drill &amp; ream the top (2) holes to finish size using drill Jig DT8583 &amp; DT8584 as per Dwg D407-667-245

6-Drill Aft rivet holes using drill Jig DT8789 as per Dwg D407-667-245. Note: Aft side has 3x top holes.

7-Drill Fwd rivet holes using drill Jig DT8789 as per Dwg D407-667-245. Drill only the top (3) holes.

8-C'sink holes as per Dwg D407-667-245. Allow rivet to sit below surface to compensate for paint.

9- Scribe tube to identify on the inner chamfer in the cuff D# and B#

10-Deburr &amp; Inspect for surface damage. Repair damage within limits as per



PTO

SAD  
11-01-27

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

CAR 11-58

Part No: D407-667-205 PAR #: NA Fault Category: CROSS 74805 NCR: Yes No DQA: NA Date: 11-08-11  
 Resolution: VAI Disposition: VAI QA: N/C Closed: CL Date: 11/08/11

NCR: 69959		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			
11-07-28	140-2	extra holes were drilled in the cross.  Lack of attention	<u>VB</u> <u>07/10</u>	Crosstube acceptable DSI 9346 will be updated to include this xtube.	<u>u/</u> <u>4</u>	<u>S</u> <u>u/08/10</u>	<u>VB</u> <u>07/10</u>	<u>VB</u> <u>11-07-28</u>

NOTE: Date &amp; initial all entries

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Item ID: D407-667-205

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Item Name: Crosstube Aft

Start Date: 5/25/2011 Start Qty: 1.00

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Required Date: 6/14/2011 Req'd Qty: 1.00

Customer:

Reference:

Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_

Run Start

QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Stop

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
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Dwg D407-667-245

150

Crosstubes Chemical Conversion

0.00

SAP 11-27-28

①



HandFXtube

Memo

0.00

Hand Finishing Crosstubes

160

QC3- Inspect Part Finish

0.00



QC

Memo

0.00

Quality Control

11 07 28 ①

170

QC5- Inspect part completeness to step on W/O

0.00



QC

Memo

0.00

Quality Control

11 07 28 ①

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

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**NOTE:** Date & initial all entries



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**Accept**

[illegible]**Setup Start**

**Stop**

**|| || || || || || || ||**

**Cust Item ID:**

[REDACTED]

**Customer:**

**Reference:**

Run Start

**Stop**

**Insp.  
Stamp**

0.00

[illegible]

Outsource2

## Memo

0.00

### Outsource process - NDT

Liquid Penetrant Inspection as per QSI 0380  
Issue P/O: 14604 LPI as per ASTM 1417  
Level 2 Attach copy of NDT results to work order

190

\_\_\_\_\_

## Packaging

0.00

### Packaging

## Memo

0.00

## Packaging

Ensure copy of NDT results attached to work order.

200

QC5- Inspect part completeness to step on W/O

0.00

[illegible]

QC

## Memo

0.00

## Quality Control

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

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Customer:

Reference:

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Run Start



QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Stop



Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
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210

0.00



SprayPaint

SprayPaint

Memo

0.00

Spray Painting

1-Prime inside and outside crosstube as per DEO D407-667-245 and QSI 005 4.2

2-Paint outside crosstube with White Imron as per QSI 005 4.2

PRIME:

Start Time: \_\_\_\_\_

Finish Time: \_\_\_\_\_

11-07-29

PAINT:

Start Time: \_\_\_\_\_

Finish Time: \_\_\_\_\_

11-07-30

25 11-07-30

220

0.00



QC14- Inspect Spray Paint

QC

Memo

0.00

Quality Control

Then, Wrap in plastic bag to protect from scratches

① 11-08-02

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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Customer:

Reference:

Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_

Run Start



QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Stop

Sequence ID/  
Work Center IDOperation  
DescriptionSet Up/  
Run Hours

Tool ID

Tool #

Plan  
CodeAccept  
QtyReject  
QtyReject  
NumberInsp.  
Stamp

230

0.00



Crosstubes

Crosstubes

Memo

0.00

Crosstubes

1- Install chafing shield as per DEO D407-667-245. Note: (3) top holes should be facing up.

2- Lightly scuff the bonded area using a 320 grit sand paper and clean the area with 41058 wash 'n' wipe

3- Install support with magnobond and install clamps as per Dwg D407-667-245 using installation jig DT9025. Torque clamps to 80-100 in lb

A/R Magnobond

Batch:

EXP:

116677  
12-02

4- Install nut plates as per Dwg D407-667-245. Touch-up rivet heads with Imron paint.

21 11-08-03

240

0.00



QC

Quality Control

QC5- Inspect part completeness to step on W/O

Memo

0.00

Sulos/04

70

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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# Work Order ID 69959

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Approvals: Process Plan: \_\_\_\_\_ Date: \_\_\_\_\_ Tooling: \_\_\_\_\_ Date: \_\_\_\_\_

Run Start



QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Stop



Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
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250

Pick Kit

0.00



Packaging

Memo

0.00

Packaging

*Copy 1*

260

QC4- 100% Inspect kits for completeness

0.00



QC

Memo

0.00

Quality Control

*Sulobos*

POSITIVE RECALL

EFFECTIVE 11/07/28 AUTH [Signature]

RELEASED [Signature] DATE [Signature]

270

Packaging

0.00



Packaging

Memo

0.00

Packaging

Identify and in kanban rack  
Location: \_\_\_\_\_

*11/14/52*

*Rev F*

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

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Run Start



QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Stop

Sequence ID/  
Work Center IDOperation  
DescriptionSet Up/  
Run Hours

Tool ID

Tool #

Plan  
CodeAccept  
QtyReject  
QtyReject  
NumberInsp.  
Stamp

280

QC21- Final Inspection - Work Order Release

0.00



QC

Memo

0.00

Quality Control

OK 11/02/08

11-08-5  
(1)

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

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# Picklist Print

Wednesday, May 25, 2011 7:51:03 AM

Page 1

Work Order ID: 69959

Parent Item: D407-667-205

Parent Item Name: Crosstube Aft

Start Date: 5/25/2011

Required Date: 6/14/2011

Start Qty: 1.00

Required Qty: 1.00

Comments: IPP Rev: C 05.09.02 Add holes for compatibility with Bell Skidtubes KJ/JLM  
IPP Rev: D Added Magnobond, Rubber Cushion & Clamps 07-02-19  
JLM

\*\*\*\*CHANGE TO CHG 005 - IF USING D2894-1 B35578 OR GREATER\*\*\*\*

IPP Rev: E 08-05-22 add comment in seq. 6 and QC15 and QC5 DD verified by: EC


IPP Rev: F 08-06-12 add comment in seq. 24 DD verified by: EC

IPP Rev: G 08-08-19 revE as per dwg DD verified by: EC

IPP Rev: H 09.01.06 ECN 08-562 EC verified by: DD IPP Rev: I

10.04.07 revise route seq. in bom DD verified by: JLM IPP Rev: J

11.04.26 removed abrasion strip ecn 11-551 EC verified by: DD

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
D407-667-205TRN  Crosstube Turning Detail		Manufactured	No			110	Each	2.0000	1	1			

Location

Loc Qty

Loc Code

LG003

2

67818

1

67819

1

AN960JD516

NAS1149D0563J

Purchased

No

230

Each

0.0000

18

18

Washer

D2873-043

Manufactured

No

230

Each

40.0000

2

2

Nut Plate Assembly

Location

Loc Qty

Loc Code

LG

36

68084

16

68801

20

LG052

4

66898

4

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

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Page 2

Work Order ID: 69959

Parent Item: D407-667-205

Parent Item Name: Crosstube Aft

Start Date: 5/25/2011

Required Date: 6/14/2011

Start Qty: 1.00

Required Qty: 1.00

D2873-045

Manufactured No

230 Each

35.0000

2 2



Nut Plate Assembly

71983



81 11-08-04

Location

Loc Qty

Loc Code

LG	20
68800	20
LG052	15
65992	5
67741	10

D2894-1

Manufactured No

230 Each

10.0000

1 1



2.750 Support

68632



81 11-08-07

Location

Loc Qty

Loc Code

LG	6
66702	6
LG052	4
43881	4

D3190-1

Manufactured No

230 Each

18.0000

2 2



Chafing Shield

72247



81 11-08-07

Location

Loc Qty

Loc Code

LG	14
68372	14
LG055	4
58569	4

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Shop Packet Print

Page 2

W/O:		WORK ORDER CHANGES					
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Parent Item: D407-667-205

Parent Item Name: Crosstube Aft

Start Date: 5/25/2011

Required Date: 6/14/2011

Start Qty: 1.00

Required Qty: 1.00

D3595-063-450

Manufactured No

230 Each

61.5400 2 2



RUBBER CUSHION

71354



85 11-08-03

Location Loc Qty Loc Code

LG	52	
67353	7	
68893	45	
LG055	9.54	
68157	9.54	

MS20601-AD4W8

Purchased No

230 Each

237.0000 14 14



RIVET

118454



85 11-08-04

Location Loc Qty Loc Code

LG	100	
108521	100	
LG051	137	
117106	37	
117381	100	

MS21920-22

Purchased No

230 Each

95.0000 4 4



Clamp(per MIL-DTL-8783C)



85 11-08-03

Location Loc Qty Loc Code

LG050	95	
116207	7	
117279	38	
117506	50	

84

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

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Work Order ID: 69959

Parent Item: D407-667-205

Parent Item Name: Crosstube Aft

Start Date: 5/25/2011

Required Date: 6/14/2011

Start Qty: 1.00

Required Qty: 1.00

MS21920-25

Purchased

No

230

Each

2.0000

2

2



Clamp(per MIL-DTL-8783C)

117998



11-08-03

Location

Loc Qty

Loc Code

LG050

2

116264

2

AN5-10A

Purchased

No

250

Each

304.0000

10

10



Bolt



118422

Location

Loc Qty

Loc Code

ST337

304

117313

179

117795

125

AN5-32A

Purchased

No

250

Each

176.0000

4

4



Bolt



117614

Location

Loc Qty

Loc Code

ST340

176

115589

51

117161

50

117514

50

117688

25

AN5-34A

Purchased

No

250

Each

130.0000

4

4



Bolt



1118401

Location

Loc Qty

Loc Code

ST340

130

116704

20

117010

20

117366

20

117794

70

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

# Picklist Print

Wednesday, May 25, 2011 7:51:04 AM

Page 5

Work Order ID: 69959



Parent Item: D407-667-205



Parent Item Name: Crosstube Aft

Start Date: 5/25/2011

Required Date: 6/14/2011

Start Qty: 1.00

Required Qty: 1.00

MS21042L5

Purchased

No

250

Each

1,243.000

4

4



Nut



*Handwritten signature*

Location

Loc Qty

Loc Code

ST300

1243

116105

283

116548

260

117441

500

117591

100

117611

100

*117891*

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

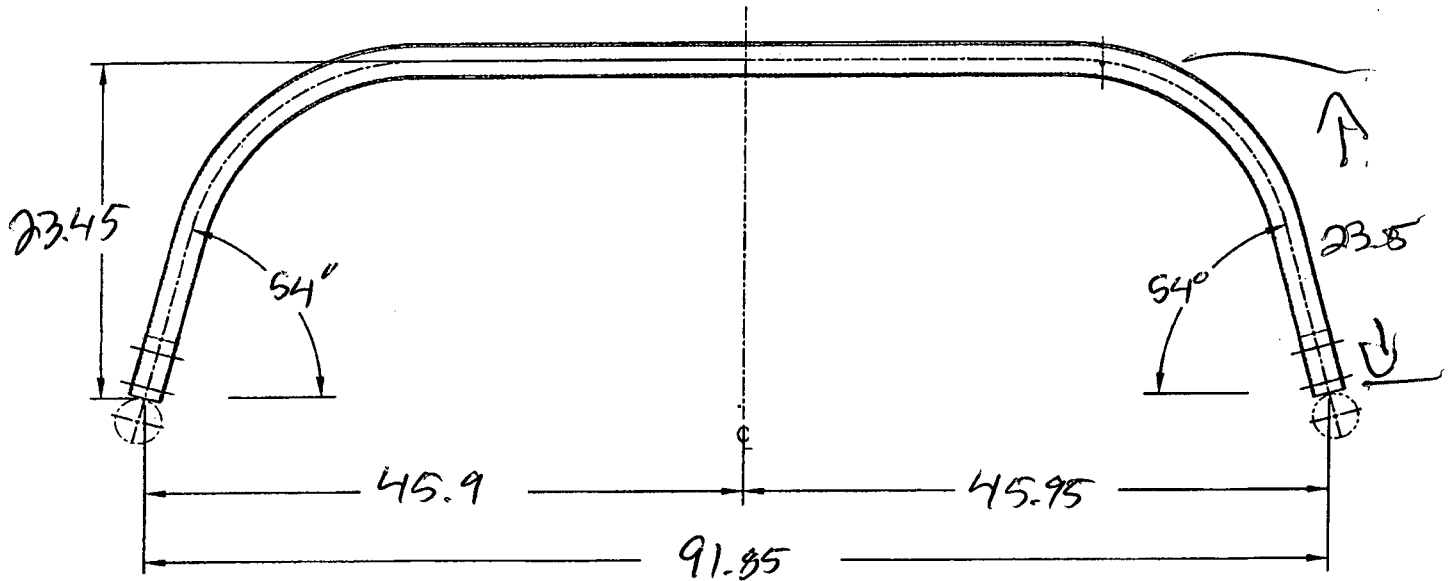
NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

DART AEROSPACE LTD		Work Order:	69959
Description: Crosstube High Aft (407)		Part Number:	D407-667-205
Inspection Dwg: D407-667-245 Rev: F		Page 1 of 1	

Required Dimension	Min	Max
Height	23.46	23.88
1/2 Span	45.86	45.98
Angle	54	56
Total Span	91.72	91.96

11.07.27



Passes	per side	Comments

QC15 Inspection	11.07.27
Date	

Rev	Date	Change	Revised by	Approved
A	07.02.06	New Issue	KJ/JM	
B	09.06.22	Dwg Rev updated	KJ	

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

Item	QTY -245	PART NUMBER	DESCRIPTION
1	X	D407-667-245	CROSSTUBE ASSEMBLY (407 HIGH AFT)
2	1	D6011-115	CROSSTUBE
3	2	D2856-400-773	ABRASION STRIP
4	2	D2873-043	NUT PLATE
5	2	D2873-045	NUT PLATE
6	1	D2894-1	SUPPORT
7	2	D3190-1	CHAFING SHIELD
8	2	D3595-063-430	RUBBER CUSHION
9	14	MS20601AD4W8	RIVET (OR NAS9302B-4-8)
10	4	MS21920-22	CLAMP
11	2	MS21920-25	CLAMP (OR MS21920-24)
12	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947- 100, TYPE II, CLASS 2 ADHESIVE)

# **GENERAL NOTES:**

- 1) MATERIAL: MANUFACTURED FROM D6011-115  
FINISHED LENGTH = 112.91±0.020
- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1  
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2  
PAINT OUTSIDE PER DART QSI 005 4.2
- 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: SCRIBE DART PART NUMBER "D407-667-245" AND BATCH NUMBER ON  
INSIDE OF CUFF USING VIBRATING STYLUS.
- 7) WEIGHT: 27.7 lbs
- 8) PART IS SYMMETRIC ABOUT CENTERLINE.
- 9) RUN-OFF PART, BLEND OUT EDGE LONGITUDINALLY, TRANSITION SHOULD BE SMOOTH.
- 10) BEND PROGRESSIVELY WITH A MINIMUM OF 6 PASSES. MAXIMUM TUBE FLATTENING DUE TO  
BENDING IS 6% BASED ON O.D.
- 11) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- 12) INSTALL D2894-1 CENTER SUPPORT USING A 0.03" TO 0.06" THICK LAYER OF MAGNOBOND  
6398 PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO  
PACKAGING.
- 13) INSTALL MS21920-25 CLAMPS WITH D3595-063-430 RUBBER CUSHIONS TO SECURE D2894-1  
SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMPS ARE OPPOSITE CROSSTUBE  
SUPPORT.  
NOTE: MS21920-24 CLAMPS CAN BE USED TO ACCOMMODATE VARYING DIAMETERS.  
ENSURE THERE IS A MINIMUM OF 1.5 THREADS IN SAFETY ON THE NUTS.
- 14) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE  
OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS  
SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT  
LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
- 15) INSTALL D2856-400-773 ABRASION STRIP WITH A 0.13 (REF) GAP ON BOTTOM SIDE OF  
CROSSTUBE, PER QSI 035.
- 16) INSTALL D3190-1 CHAFING SHIELDS SO THAT OVERLAP IS ON BOTTOM SIDE OF CROSSTUBE  
OPPOSITE D2894-1 SUPPORT.
- 17) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS ARE SHOWING IN  
SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

SHOP COPY  
RETURN TO  
ENGINEERING  
UNCONTROLLED COPY  
SUBJECT TO AMENDMENT  
WITHOUT NOTICE  
WORK ORDER  
NO. 69959  
PL 11-05-25

DEO ATTACHED

RELEASED  
05/11/12 N/A

F	REFORMAT NOTES TO NEW STANDARDS (ZN B8-1); RELOCATED FLAG #6 (ZN A8-3) PER NCR 210; REMOVED REF. & ADD TOLERANCES (ZN C6-3, C4-3 & D2-3)	RF	08.11.06
E	8.02 AND 8.53 WERE 8.40 AND 8.90 (ZN D5-2); REORGANIZED VIEWS AND REFORMATED DRAWING TO CURRENT STANDARDS. REASONS: CLAMPS MOVED 0.375 TOWARD CL TO ELIMINATE INTERFERENCE WITH AIRCRAFT MOUNTS. REFERENCE: PAR#08-21 AND ECN#1225	MB	08.07.24
D	ADD VIEW FOR OEM SKID HOLES, ROTATE ORIENTATION OF CLAMPS SECTION F-F, REMOVE -851 ABRASION STRIP, ADD MAGNOBOND 6398, ADD CUSHION	PH	07.02.07
C	ADD HOLES AND NUT PLATES FOR COMPATIBILITY WITH BHT/AA SKIDTUBES	PH	05.07.26
B	ADD CHAFING SHIELD	CP	03.05.21
A	NEW ISSUE	CP	02.05.13
REV.	DESCRIPTION	BY	DATE
DESIGN	RF	DART AEROSPACE LTD HAWKESBURY, ONTARIO, CANADA	
DRAWN	RF	DRAWING NO. REV. F D407-667-245 SHEET 1 OF 4	
CHECKED	RF	TITLE SCALE CROSSTUBE ASSY (407 HIGH AFT) NTS	
MFG. APPR.	RF	DATE 08.11.06	
APPROVED	RF	COPYRIGHT © 2002 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD	
DE APPR.	RF		

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

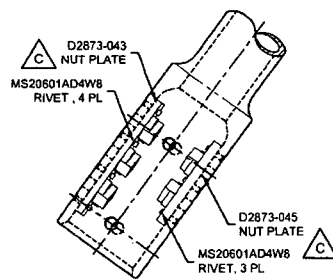
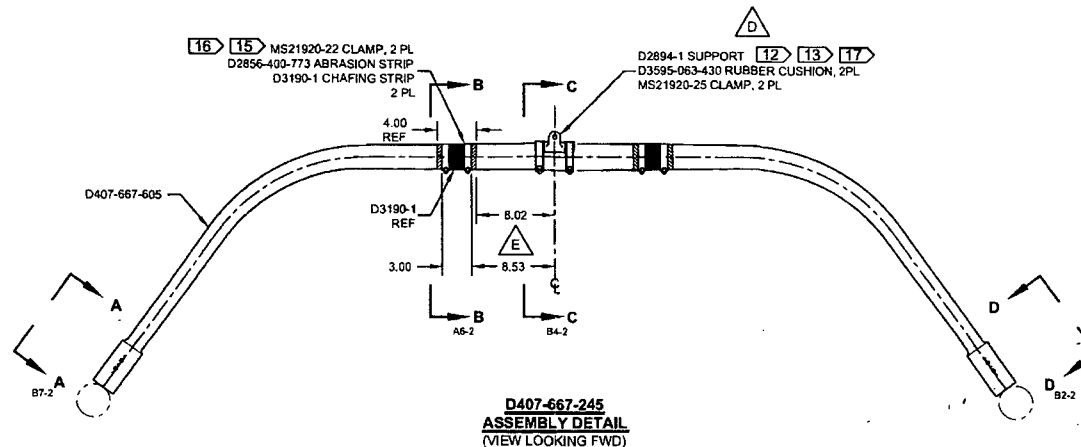
Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

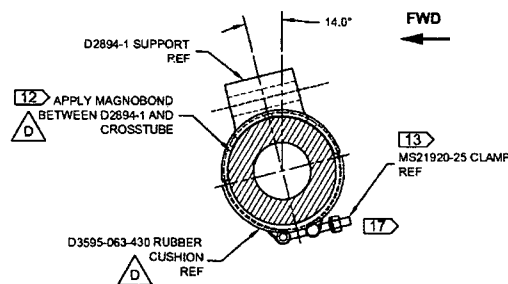
NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

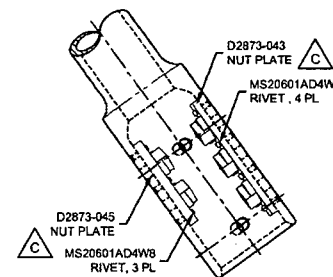




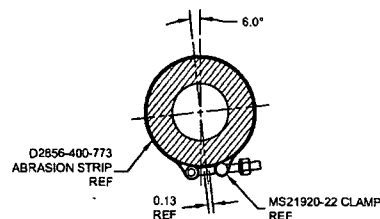
**VIEW A-A CUFF DETAIL**  
SCALE 4X



**SECTION C-C**  
SCALE 4X



**VIEW D-D CUFF DETAIL**  
SCALE 4X



**SECTION B-B**  
SCALE 4X, 2PL

DEO ATTACHED  
RELEASED  
08/11/06

DESIGN	40	<b>DART AEROSPACE LTD</b>	
DRAWN	RF	HAWKESBURY, ONTARIO, CANADA	
CHECKED	RF	DRAWING NO. D407-667-245	REV. F
MFG. APPR.	RF	TITLE	SHEET 2 OF 4
APPROVED	RF	CROSS-TUBE ASSY (407 HIGH AFT)	SCALE
DE APPR.	RF		NTS
DATE	08.11.06	<small>COPYRIGHT © 2002 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.</small>	

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries



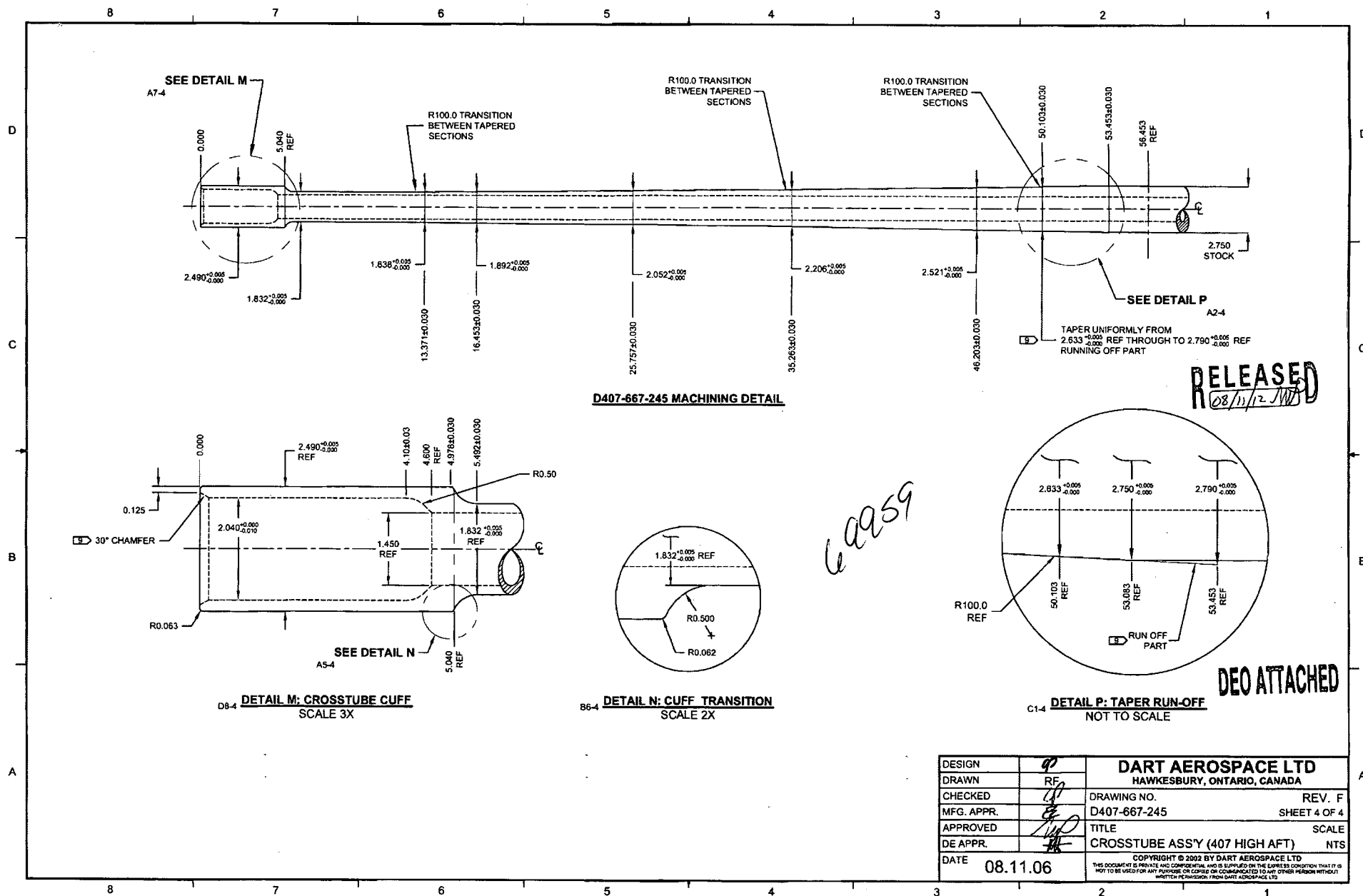
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DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries



W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

DRAWING NO. D407-667-245	TITLE CROSSTUBE ASSY (407 HIGH AFT)	REV. F	DART AEROSPACE LTD ENGINEERING ORDER		D.E.O. NO. D407-667-245-F-1	SHEET NO. SHEET 1 OF 2	SCALE NTS
DRAWN J	CHECKED 47	MFG. APPR. E	APPROVED 140		DE APPR. H		
DATE 11.04.08	DATE 11.04.12	DATE 11.04.12	DATE 11.04.12		DATE 11.04.12		

**PURPOSE:**

REMOVED ABRASION STRIP IN FAVOR OF A THIN LAYER OF PROSEAL 890.

**CHANGE:**

PARTS LIST IS AMENDED AS FOLLOWS:

**IS:**

Item	Qty -245	Part Number	Description
3	0	D2856-400-773	ABRASION STRIP

**WAS:**

3	2	D2856-400-773	ABRASION STRIP
---	---	---------------	----------------

NOTES 2 AND 15, SHEET 1 ARE AMENDED AS FOLLOWS:

**IS:**

- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1  
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2  
MASK UNDERSIDE OF CROSSTUBE AS SHOWN (HATCHED AREA) AND  
PAINT OUTSIDE PER DART QSI 005 4.2  
REMOVE MASKING AND APPLY CLEAR COAT
- 15) APPLY A THIN COAT OF PROSEAL 890 ON INSIDE CONCAVE SURFACE OF D3190-1  
CHAFING SHIELDS AND LET CURE PER MANUFACTURER'S INSTRUCTIONS. INSTALL  
PROSEALED D3190-1 CHAFING SHIELDS ONTO CROSSTUBE BY APPLYING A THIN COAT  
OF PROSEAL 890 ONTO CROSSTUBE. BE SURE TO ELIMINATE ANY AIR GAPS.

**WAS:**

- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1  
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2  
PAINT OUTSIDE PER DART QSI 005 4.2
- 15) INSTALL D2856-400-773 ABRASION STRIP WITH A 0.13 REF GAP ON BOTTOM SIDE OF  
CROSSTUBE PER QSI 035.

RELEASED  
2011-04-18  
140

69959

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
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**NOTE:** Date & initial all entries

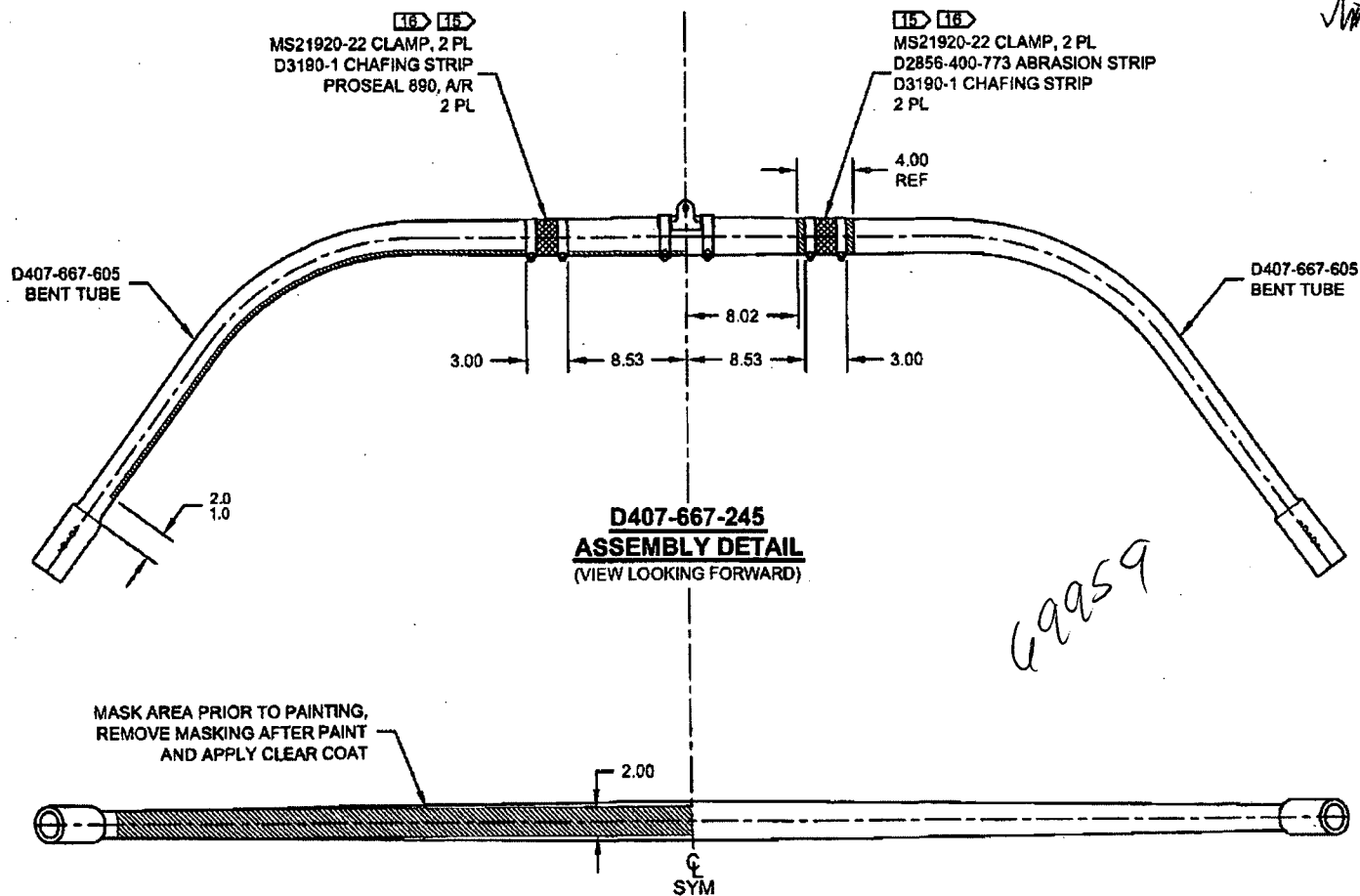


DRAWING NO. D407-667-245	TITLE CROSSTUBE ASSY (407 HIGH AFT)	REV. F	DART AEROSPACE LTD ENGINEERING ORDER	D.E.O. NO. D407-667-245-F1	SHEET NO. SHEET 2 OF 2	SCALE NTS
DRAWN	CHECKED <i>UP</i>	MFG. APPR. <i>EZ</i>	APPROVED <i>UP</i>	DE APPR. <i>#</i>		
DATE 11.04.08	DATE 11.04.11	DATE 11.04.12	DATE 11/04/12	DATE 11.04.12		

IS:

WAS:

RELEASED  
2011-04-18



W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries



ACUREN

## LIQUID PENETRANT TEST REPORT

P- 05625

CLIENT

ATTENTION

ADDRESS

PROJECT

ITEM(S) EXAMINED

DATE

ACUREN JOB NO.

POWOW NO.

WORK LOCATION

ACCEPTANCE STD.

PAGE

OF

TIME

AM

PM

□

JOB DESCRIPTION

PROCEDURE NO. LT-002 REV/DATE 2003

TECHNIQUE NO. LT-002 REV/DATE 2003

ART NO.

MATERIAL

THICKNESS

SCOPE

## TEST DETAILS

METHOD

☒ FLUORESCENT☐ VISIBLE☒ WATER WASH☐ SOLVENT REMOVABLE☐ POST EMULSIFIED

FAMILY BRAND

MACONFLUX

BLACK LIGHT S/N 13788

☐ OUTPUT > 1000  $\mu$ W/cm<sup>2</sup>☒ AMBIENT < 2 fc

PENETRANT

ZL-67

MINIMUM DWELL TIME

10

MIN.

LIGHTING EQUIP.

☐ FLASHLIGHT ☐ TROUBLELIGHT☐ OUTPUT > 100 fc @ SURFACE

PENETRANT REMOVER

H<sub>2</sub>O

MINIMUM DRY TIME

&gt;10

MIN.

OTHER

DEVELOPER

SKD-53

MINIMUM DWELL TIME

10

MIN.

LIGHT METER S/N

CAL DUE DATE 11/15/2011

DEVELOPER TYPE

☒ NON AQUEOUS☐ AQUEOUS☐ DRY

## TEST SURFACE

SURFACE CONDITION

☐ AS GROUND☐ AS WELDED☐ MACHINED☐ SHOT BLASTED☒ CLEAN BARE METAL

SURFACE TEMPERATURE

☐ < -4°C/ 20°F☐ -4°C/ 20°F TO 10°C/50°F☒ 10°C/50°F TO 52°C/125°F☐ > 52°C/125°F

## RESULTS-

☐ METRIC☐ IMPERIAL

1	CROSSTUBE	W.O. ID	72017	✓	ITEM ID	D407-667-205	AFT
2	"	W.O. ID	72017	✓	ITEM ID	D012-664-101MB	FWD
3	"	W.O. ID	72039	✓	ITEM ID	D012-664-101	FWD
4	"	W.O. ID	71825	✓		D407-667-205	AFT
5	"	W.O. ID	71824	✓		D407-667-205	AFT
6	"	W.O. ID	72260	✓		D012-664-101	FWD
7	"	W.O. ID	71437	✓		D012-664-201	AFT
8	"	W.O. ID	72018	✓		D012-664-201	AFT
9	"	W.O. ID	71438	✓		D012-664-201MB	AFT
10	RAPPEL	W.O. ID	69692	✓		D012-664-201	AFT
NO RELEVANT INDICATION WAS DETECTED AS PER APPLICABLE STANDARDS					ITEM ID	D3011-1	
					BT	11-67-29	

## Scope of Services

The agreement of Acuren Group Inc. to perform services extends only to those services provided for in writing. Under no circumstances shall such services extend beyond the performance of the requested services. It is expressly understood that all descriptions, comments and expressions of opinion reflect the opinions or observations of Acuren Group Inc. based on information and assumptions supplied by the owner/operator and are not intended nor can they be construed as representations or warranties. Acuren Group Inc. is not assuming any responsibilities of the owner/operator and the owner/operator retains complete responsibility for the engineering, manufacture, repair and use decisions as a result of the data or other information provided by Acuren Group Inc. In no event shall Acuren Group Inc.'s liability in respect of the services referred to herein exceed the amount paid for such services.

## Standard of Care

In performing the services provided, Acuren Group Inc. uses the degree, care and skill ordinarily exercised under similar circumstances by others performing such services in the same or similar locality. No other warranty, expressed or implied, is made or intended by Acuren Group Inc.

## SIGNATURES

CLIENT REPRESENTATIVE

TECHNICIAN (SIGNATURE):

NAME (PRINT):

1<sup>ST</sup> TECHNICIAN

CGSB LEVEL

SNT LEVEL

CGSB REG. NO.

2<sup>ND</sup> TECHNICIAN

CGSB LEVEL

SNT LEVEL

CGSB REG. NO.

DTR # 244712

REPORT

REVIEWED BY:

NAME

INITIALS

WHITE - CLIENT COPY

CANARY - OFFICE COPY

PINK - TECHNICIAN COPY

GOLD - OFFICE COPY

PT Sept 2005

**Work Order ID 69959**

Wednesday, May 25, 2011 7:50:49 AM



Page 1

Item ID: D407-667-205

Accept



Setup Start



Revision ID:

Stop



Item Name: Crosstube Aft

Start Date: 5/25/2011 Start Qty: 1.00



Cust Item ID:

Required Date: 6/14/2011 Req'd Qty: 1.00



Customer:

Reference:

Run Start



Approvals:

Process Plan:

*P*

Date: 11-05-25

Tooling:

Date:

Stop



QC:

Date:

SPC (Y/N):

Date:

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
Draw Nbr	Revision Nbr								
D407-667-245	Rev F								
100		0.00							
	DOCUMENT CONTROL								
DC	Memo	0.00							
Document Control	Photocopy bluefile and create labels as per PPP D407-667-205 CHG006								
110		0.00							
	Pick Kit								
Packaging	Packaging								
Packaging	Memo	0.00							
120		0.00							
	BENDING MACHINE - CROSSTUBES								
CNC Bend 1	Memo	0.00							
CNC Delta 100 Bender	1-Bend tube as per Dwg D407-667-245 using CNC bender program 407 Aft and Folio 21								

*11-08-4**DP**11-7-26**DP**11-7-26*

# DART SERVICE INSTRUCTION

**TO AMEND INSTALLATION INSTRUCTIONS: IIN-D206-667 REV. C**  
 REF. CANADIAN STC: SH01-5  
 REF. FAA STC: SR01304NY



THE FOLLOWING D206-667-101/-103/-203 AND D407-667-105/-205 CROSSTUBES HAVE EXTRA HOLES DRILLED ON THE AFT SIDE OF THE CUFFS. THIS HOLE IS NOT REQUIRED FOR INSTALLATION OF DART CROSSTUBES ONTO BHT/AAI SKIDTUBES AS SHOWN IN FIGURE 1.

CUSTOMERS RECEIVING CROSSTUBES AT CHG 002 PRIOR TO 06.08.08 SHOULD CONTACT DART FOR DISPOSITION IF INSTALLING THE DART CROSSTUBES ONTO BHT/AAI SKIDTUBES PER IIN-D206-667 REV. C.

CUSTOMERS RECEIVING CROSSTUBES AT CHG 002 PRIOR TO 06.08.08 TO BE INSTALLED WITH DART SKIDTUBES MAY FIND THAT THE SUPPORTS HAVE BEEN INSTALLED BACKWARDS. THE SUPPORTS SHOULD BE REMOVED AND RE-INSTALLED PER ICA-D206-667.

PART NUMBER	CHANGE NUMBER	BATCH NUMBER
D206-667-101	002	B24244, B28679, B29261
D206-667-103	002	B26702, B26704, B27980, B25606, B25605, B23220, B23219, B23218, B23217, B28682, B28683, B32644, B34139, B36053, B66344
D206-667-203	002	B27492, B27491, B27981, B25609, B25608, B25006, B24646, B34144, B36059
D206-667-203	003	B39852, B51939, B51940, B66405
D407-667-105	002	B31553
D407-667-105	003	B39271, B56799
D407-667-205	007	B69959



M	ADD D407-667-205 & B/N B69959	MB	11.07.28
L	ADD B/N B66344	MB	11.03.31
K	ADD B/N B66405	CP	11.03.08
J	ADD B/N B56799	CP	10.04.09
I	ADD B51939, B51940	CP	09.10.08
H	ADD B39271, B39852	PH	08.06.16
G	ADD B36053, B36059	PH	08.01.17
F	ADD B34139, B34144	MB	07.10.22
E	ADD D407-667-105 & B31553	MB	07.08.14
D	ADD B32664	MB	07.07.24
C	ADD B29261	MB	06.11.20
B	ADD B28679, B28682, B28683	PH	06.10.10
A	NEW ISSUE	PH	06.08.08
REV.	DESCRIPTION	BY	DATE

CANADA  
 DEPARTMENT OF TRANSPORT  
 AIRCRAFT CERTIFICATION  
 BRANCH  
 DAO # 01-O-01

APPROVED

BY:   
 D. SHEPHERD (DE # 02)

DATE: 11.08.02  
 CERT. NO.: SH01-5  
 ISSUE NO.: 3

DESIGN	PH	<b>DART AEROSPACE LTD</b> HAWKESBURY, ONTARIO, CANADA	
DRAWN	B		
CHECKED	ASS	DRAWING NO.	REV. M
MFG. APPR.	N/A	DSI 9346	SHEET 1 OF 2
APPROVED	MD	TITLE	SCALE
DE APPR.	H	DEVIATION ON D206-667 & D407-667	NTS
DATE	11.07.28	COPYRIGHT © 2006 BY DART AEROSPACE LTD <small>THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.</small>	

## Paul Slusarczyk

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**From:** Eric Downing <edowning@dartaero.com>  
**Sent:** August-05-11 3:56 PM  
**To:** 'Linda Lacelle'; 'Susanne Sheldon'; 'David Shepherd'; 'Bill Beckett'; 'Jean-Luc Menard'  
**Cc:** 'Susanne Sheldon (Susanne Sheldon)'; 'Marc Bellavance'; 'Eric Charbonneau'; 'Paul Slusarczyk'  
**Subject:** RE: DSI 9346 Rev M

And for everyone's knowledge I know that 2 of the tubes were added to this dsi only for the fact the when drilling the holes the drill bit touch the inside of the cuff causing a small dimple so they were drilled out and added to the dsi.

-----Original Message-----

**From:** Linda Lacelle [<mailto:llacelle@dartaero.com>]  
**Sent:** August 5, 2011 3:15 PM  
**To:** 'Susanne Sheldon'; 'David Shepherd'; 'Bill Beckett'; 'Jean-Luc Menard'  
**Cc:** 'Susanne Sheldon (Susanne Sheldon)'; 'Eric Downing'; 'Marc Bellavance'; 'Eric Charbonneau'; 'Paul Slusarczyk'  
**Subject:** RE: DSI 9346 Rev M

I was just looking into the amount of crosstubes produced (not including any scrap or 350's) and last year we produced 168 good crotubes for the whole year, and this year we're already at 159 crosstubes produced. I think that 3 DSI's for that many crosstubes (less than 2%) is pretty good considering the

1) training in the last few mhts 2) the pressure everyone's under 3) the heat in the shop Just my opinion....

Linda

-----Original Message-----

**From:** Susanne Sheldon [<mailto:ssheldon@dartaero.com>]  
**Sent:** August 5, 2011 8:25 AM  
**To:** 'David Shepherd'; 'Bill Beckett'; 'Jean-Luc Menard'  
**Cc:** 'L Lacelle'; 'Susanne Sheldon (Susanne Sheldon)'; 'Eric Downing'; 'Marc Bellavance'; 'Eric Charbonneau'; 'Paul Slusarczyk'  
**Subject:** RE: DSI 9346 Rev M

CAR11-58 has been raised to record the root cause investigation and corrective actions.

-----Original Message-----

**From:** David Shepherd [<mailto:dshepherd@dartaero.com>]  
**Sent:** August 04, 2011 4:29 PM  
**To:** 'Bill Beckett'; 'Jean-Luc Menard'  
**Cc:** 'L Lacelle'; 'Susanne Sheldon (Susanne Sheldon)'; 'Eric Downing'; 'Marc Bellavance'; 'Eric Charbonneau'; 'Paul Slusarczyk'  
**Subject:** RE: DSI 9346 Rev M

Thanks Bill ... Just getting tired of signing that DSI in my old age.

David

-----Original Message-----

**From:** Bill Beckett [<mailto:bbeckett@darths.com>]

Sent: August-04-11 2:08 PM

To: 'David Shepherd'; Jean-Luc Menard

Cc: 'L Lacelle'; 'Susanne Sheldon (Susanne Sheldon)'; 'Eric Downing'; 'Marc Bellavance'; Eric Charbonneau; Paul Slusarczyk

Subject: RE: DSI 9346 Rev M

David - I have reviewed this with Dan, Eric and Marc. Believe it or not, they have implemented several measures to stop this happening (stub drills, color-coded plugs on the drill fixtures to avoid putting 3 holes instead of 2 on the other side etc. Clearly these measures have not been entirely effective and we need a more robust solution. It may well be that we need a drill jig that remains on the crosstube until all the holes are drilled.

JL - Eric is away until Aug 19. Can you have a look at this when you get back on the 15th.

Thanks,  
Bill

-----Original Message-----

From: David Shepherd [<mailto:dshepherd@dartaero.com>]

Sent: August 4, 2011 3:35 PM

To: 'Marc Bellavance'

Cc: 'L Lacelle'; 'Bill Beckett'; 'Susanne Sheldon (Susanne Sheldon)'; 'Eric Downing'

Subject: DSI 9346 Rev M

Marc/Linda,

Signed DSI 9346 is attached.

Bill/Susanne,

I've asked before and I'm going to ask again ...

In the last 5 years, we've misdrilled 35 crosstubes and Engineering has had to revise DSI 9346 13 times to document the deviation to the customers since it can be confusing to have an extra hole in the crosstube cuff and it can lead to the supports being installed backwards ... Obviously, after 5 years, we haven't figured out a way to drill these tubes properly. Can you get someone to take ownership of this situation and come up with a procedure that prevents these tubes from being misdrilled. Perhaps a shorter drill or a backstop or something ...

It is inefficient for us to be continually having this problem and the Engineering team has much better things to be doing than continually revising this DSI.

Frustrated in YYC,  
David

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PLEASE NOTE OUR NEW CORPORATE OFFICE ADDRESS: 4650 North Avenue, Oceanside, California 92056

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